GC/MS Training Checklist

1. Introduction to the GC/MS instrument

- ➤ Injector-Factors affecting volatility: Boiling Point Temperature (B.P.), Base v. salt forms (including Na salts), Injector Schematics and Split Ratio Concept
- ➤ Column-Factors affecting separation: Relationship between B.P., Oven Temperature, Column Sample Delivery Techniques, Interaction with Liquid Phase, Separation Efficiency -Column ID, Length and Film Thickness
- ➤ **Ion Source**: How Sample is Ionized and focused to mass filter, Source Schematics
- ➤ Quadrupole: Mass filter creates stabile trajectory for one m/z ratio, scans mass range by incrementally varying the electric field.
- Working knowledge of **Chemstation** method creation, specifically method acquisition parameters and method integration. Review Library Searches and Data Analysis features to diagnose problems.

2. Chemical fate of Drug after GC/MS

- EI spectrum of Drug is the base form, Molecular Ion not always present
- Parent compound plus artifacts
- Artifact(s) only, including Dehydration product (-H2O) or parent compound minus functional group, ie –SO2, -CH3, etc
- Reactive with solvent

3. Limitations of GC/MS

- > Compounds must be volatilized by the GC
- Possibility of Thermal Breakdown or solvent reactivity
- Will not determine salt forms or distinguish between enantiomers
- Identification of unknowns normally limited by libraries searched and reference books: Review Clarke's and Pfleger Reference books.
- Library match quality not always accurate using purchased libraries: reason for user created library.

4. Ability to Qualify Instrument for Use

- **A**. Instrument Quality Control:
- > Standard Spectra Tune for Correct Mass Assignment, Unit Mass Resolution, and Standardized Relative Ion Abundances.
- Ability to interpret Tune Report and determine when maintenance is required.
- **B**. Method Quality Control
- ➤ Blanks
- > QC Mix- To assess injector, column suitability for use and verify Tune Report.
- > Standards consistent with QC Folder

5. Understand GC/MS Protocol

- > Sample Submission Requirements and Chain of Custody
- ➤ Batch Setup Procedures
- ➤ Knowledge of the different methods, when/why they are used and which standards to use
- ➤ QA/QC Requirements: Tune Interpretation/approval, QC Mix documentation, Protocol for Requesting New Standard, Documenting Maintenance Logbook, Report when standards in circulation are not consistent with QC folder, Report Library Search Problems for future accuracy
- Acceptance Criteria for Retention Time and Mass Spectral Matches
- Working knowledge of Data Analysis: Use of background subtraction, PBM Searches and Nist Searches, Extracted Ion Chromatogram, Manual Integration, Data retrieval and Processing
- ➤ Analysis of Unknown Samples
- ➤ Protocol for Documenting Results and GC/MS Sample History
- Data Storage.

6. Basic Skills in Maintenance and Troubleshooting

- Syringe Replacement
- ➤ Injection Port liner maintenance and daily injector maintenance
- Leak Detection
- Column Replacement and Conditioning
- Filament Selection, Ion Source Cleaning and Maintenance
- ➤ How to Use an Ohm Meter to Check Filaments, Heaters, Sensors, etc for Continuity.
- Changing Tanks